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EXAMINER
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NADAV, ORI

ART UNIT	PAPER NUMBER
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2811

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**GROUP 2800**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/626,336  
Filing Date: July 24, 2003  
Appellant(s): BRASK ET AL.

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Timothy N. Trop  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed December 29, 2006 appealing from the  
Office action mailed 2/1/2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,887,310	Hwu et al.	5-2005
6,645,807	Tsuzumitani et al.	11-2003

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 7 and 9-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Hwu et al.

Hwu et al. teach in figure 1 and related text (column 3, lines 18-37) a method comprising forming a metallic precursor 5 directly on a semiconductor substrate 1 and oxidizing said metallic precursor in a liquid oxidizer.

Regarding claims 11 and 12, Hwu et al. teach forming the metal oxide dielectric of hafnium, zirconium, or tantalum (column 5, line 13), and using physical vapor deposition to deposit the metallic film.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hwu et al. in view of Tsuzumitani et al.

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Hwu et al. teach substantially the entire claimed structure, as applied to claim 7 above, except using a liquid oxidizer selected from the group including solutions of O<sub>3</sub>, H<sub>2</sub>O<sub>2</sub> and organic peroxide.

Tsuzumitani et al. teach in figure 1 and related text forming a metal oxide dielectric 7A using a liquid oxidizer selected from the group including solutions of O<sub>3</sub>, H<sub>2</sub>O<sub>2</sub> and organic peroxide (column 7, lines 42-45).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a liquid oxidizer selected from the group including solutions of O<sub>3</sub>, H<sub>2</sub>O<sub>2</sub> and organic peroxide, in Hwu et al.'s device, in order to use the appropriate material for the application in hand. Note that substitution of materials is not patentable even when the substitution is new and useful. *Safetran Systems Corp. v. Federal Sign & Signal Corp.* (DC NIII, 1981) 215 USPQ 979.

### **(10) Response to Argument**

Appellant argues that Hwu et al. teach an electrolyte and not a liquid oxidizer.

Appellant further argues that "What causes the oxidation in the cited reference is electrical current passing through the electrolyte which itself is not an oxidizer".

Appellant provides definitions for "electrolyte" (*"a chemical compound which when molten or dissolved in certain solvents, usually water, will conduct an electrical current"*), "anodic reaction" (*"a reaction in the mechanism of electrochemical corrosion in which the metal forming the anode dissolves in the electrolyte in the form of positively charged ions"*), "electrolysis" (*"a method by which chemical*

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*reactions are carried out by passage of electric current through a solution of electrolyte or a molten salt")* and "oxidizing agent" ("*a compound that gives up oxygen easily, removes hydrogen from another compound or tracks negative electrons*") from McGraw-Hill Dictionary, to support the argument that an electrolyte is not a liquid oxidizer.

Appellant describes on page 3, lines 3-8 of the specification a method of oxidizing a metallic precursor in a liquid oxidizer. Appellant states that "film 12 may be oxidized in the presence of a liquid oxidant to form an oxidized metallic film such as  $\text{HfO}_2$ ,  $\text{ZrO}_2$ , or  $\text{Ta}_2\text{O}_5$ . In this case, an oxidizer, such as  $\text{O}_3$ ,  $\text{H}_2\text{O}_2$ , or organic peroxide may be utilized in a solution. An aqueous solution may be utilized in some embodiments." That is, appellant simply states that a metallic film is oxidized by using  $\text{O}_3$ ,  $\text{H}_2\text{O}_2$ , or organic peroxide or an aqueous solution, with no further description as to the exact process of oxidizing film 12.

Hwu et al. also teach in figure 1 and related text (column 3, lines 18-37) a method of oxidizing a metallic precursor in a liquid oxidizer. Hwu explicitly states that, "to oxidize a metal to form a metallic oxide by liquid phase anodic oxidation" (column 3, lines 22-23 and 29-30). That is, Hwu et al. use "electrolyte 8", which is "DI water or other organic or inorganic electrolyte", as the solution to oxidize metal film 5. In other words, Hwu also teach oxidizing a metallic film using an aqueous solution. Although current flows in the electrolyte solution, the metallic film is still oxidized in a liquid. Therefore, the liquid is the oxidizer. The claim simply states "*oxidizing said metallic precursor*

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*in a liquid oxidizer*". The broad recitation of the claims does not preclude the liquid from having current flows therein while the metallic film is being oxidized.

Regarding appellant argument that "electrolyte" is not an "oxidizer", office personnel must give claims their broadest reasonable interpretation in light of the supporting disclosure. See, e.g., *In re Zletz*, 893 F.2d 319, 321 - 22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). Therefore, although the McGraw-Hill Dictionary defines "oxidizing agent" ("oxidizer") as "*a compound that gives up oxygen easily, removes hydrogen from another compound or tracks negative electrons*", the broader definition of the term "oxidizing agent" ("oxidizer") is "a substance that oxidizes something", as is also defined in Merriam Webster Dictionary. Clearly, Hwu et al. teach a substance (electrolyte 8) that oxidizes something (metal film 8).

Furthermore, even by considering the McGraw-Hill definition, Hwu et al. teach in figures 1c and 2 a compound (electrolyte 8) that gives up oxygen, removes hydrogen from another compound or tracks negative electrons (see OH<sup>-</sup> elements depicted in figure 2).

Moreover, both appellant and Hwe et al. use aqueous solution to oxidize a metal film. It is unclear why the solution of appellant is called "oxidizer" and the solution of Hwe et al. (the "electrolyte") cannot be called "oxidizer", since both solutions are the substances which oxidize the metallic film. The fact that the liquid solution of Hwu et al. conducts current should not preclude it from being called "oxidizer".

Regarding appellant's argument that the claimed liquid oxidizer is different from the liquid ("electrolyte") of Hwe et al., appellant describes in the disclosure that *"film 12 may be oxidized in the presence of a liquid oxidant", wherein "an oxidizer, such as O<sub>3</sub>, H<sub>2</sub>O<sub>2</sub>, or organic peroxide may be utilized in a solution. An aqueous solution may be utilized in some embodiments."*

Appellant does not provide a detailed description as to how metallic film 12 is oxidized by said liquid oxidant. However, it is well known in the art to use organic peroxide and aqueous solution as electrolyte. Therefore, the liquid used in appellant's invention is identical to the liquid conventionally used as electrolyte, and thus can function as "electrolyte", and can also conduct current. Furthermore, the broad description in the disclosure does not preclude using appellant's liquid oxidant as electrolyte.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.



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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

O.N.

Conferees:

David Blum

A handwritten signature in black ink, appearing to read "Blum", with a long horizontal stroke extending to the right.

Richard Elms

A handwritten signature in black ink, appearing to read "Elms", with a large, stylized "E" and a long, curved stroke extending downwards.

Ori Nadav

A handwritten signature in black ink, appearing to read "Nadav", with a stylized "N" and a long, curved stroke extending to the right.